

SWITCHING CIRCUIT TO REDUCE SENSING  
CURRENT DUTY CYCLE  
(CRC CIRCUIT)

FIG.1 PRIOR ART

# SENSING PULSE & LOAD WAVEFORMS PRODUCED BY ORIGINAL CRC DESCRIBED IN PATENT NUMBER 6,100,510 (DATA TAKEN ACROSS R4 +RH)

- SENSING PULSE BEGINS AT OR NEAR ZERO CROSS AND ENDS AT OR BEFORE 60°  
16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

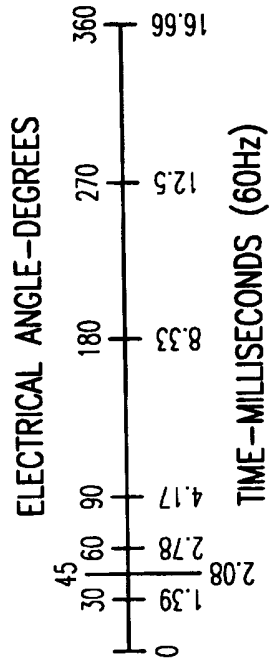
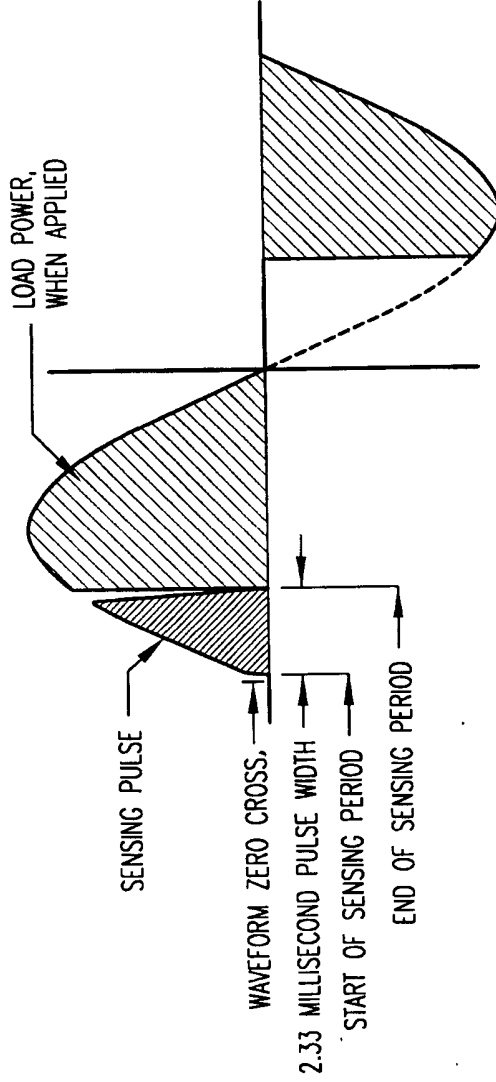
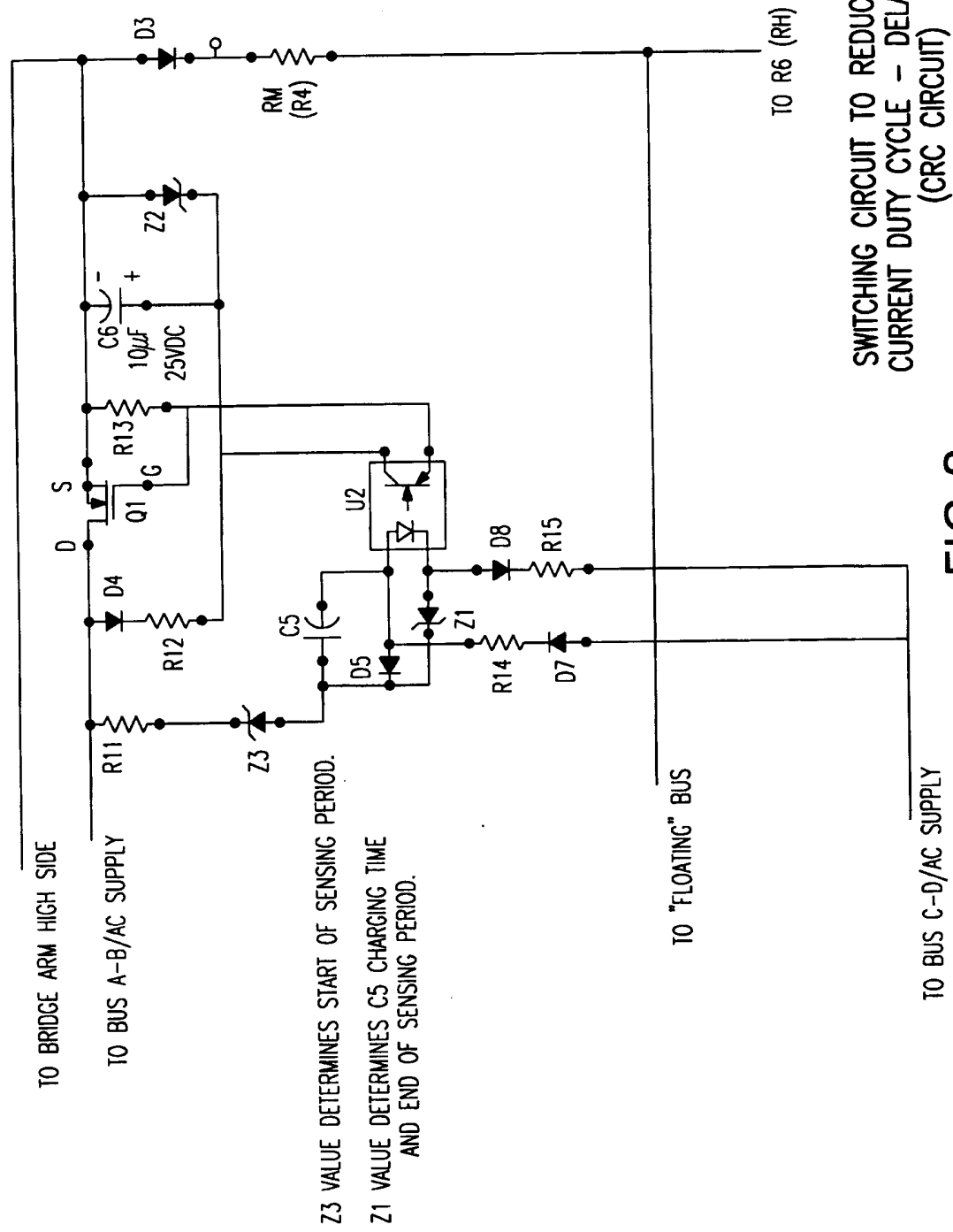


FIG.2 PRIOR ART



# DELAYED START SENSING PULSE & LOAD WAVEFORMS

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60°  
16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

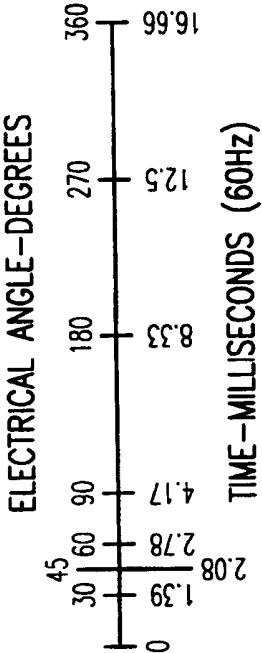
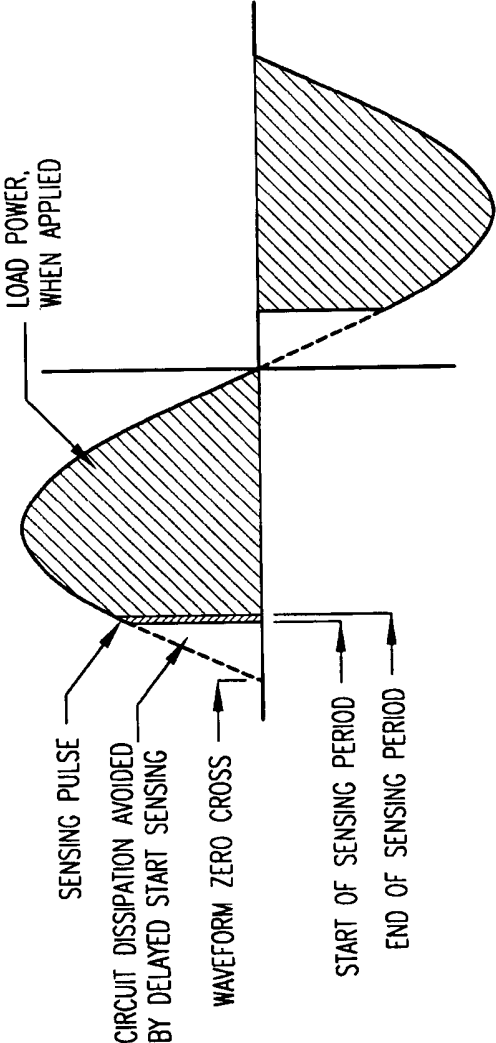
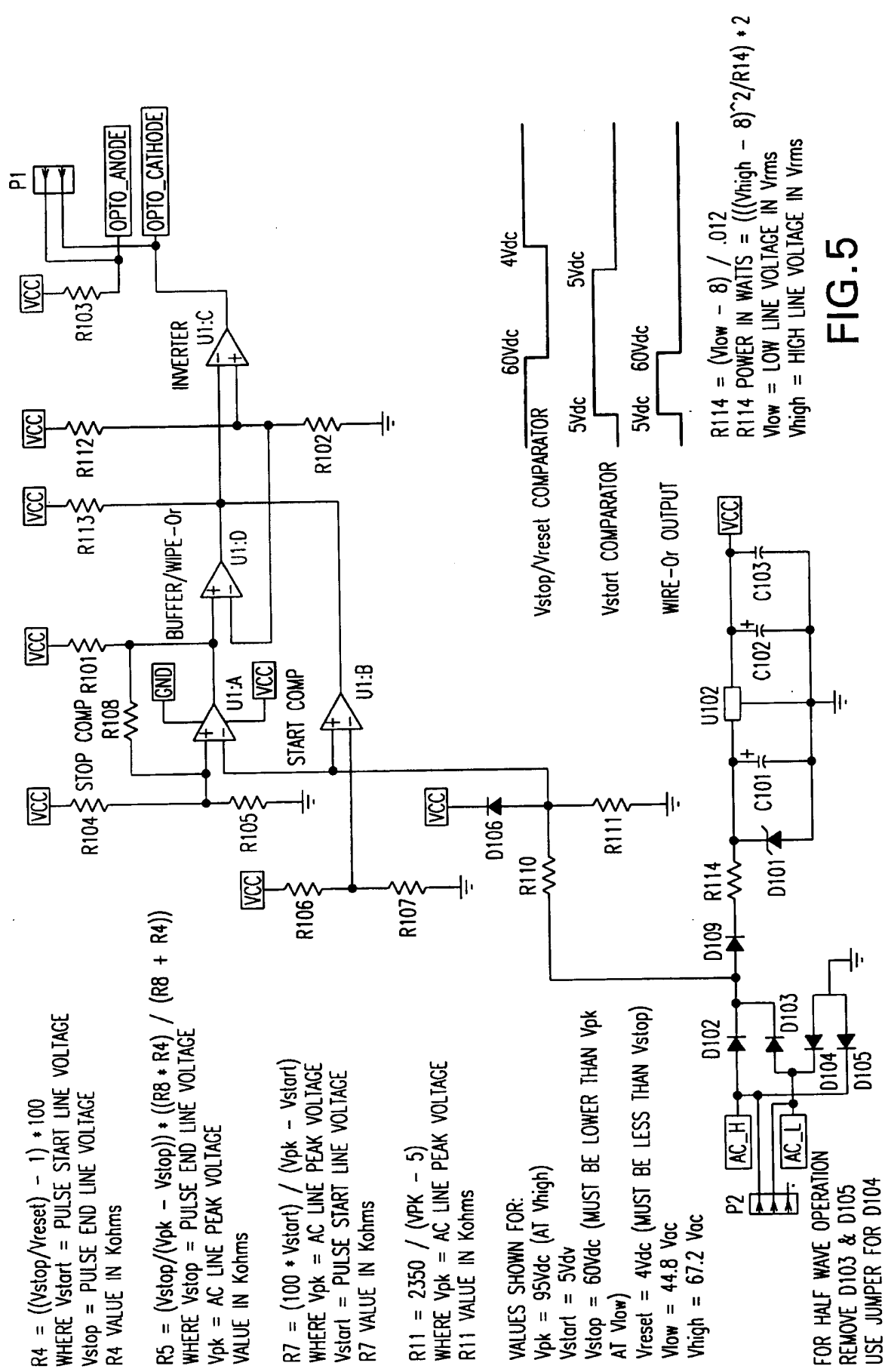
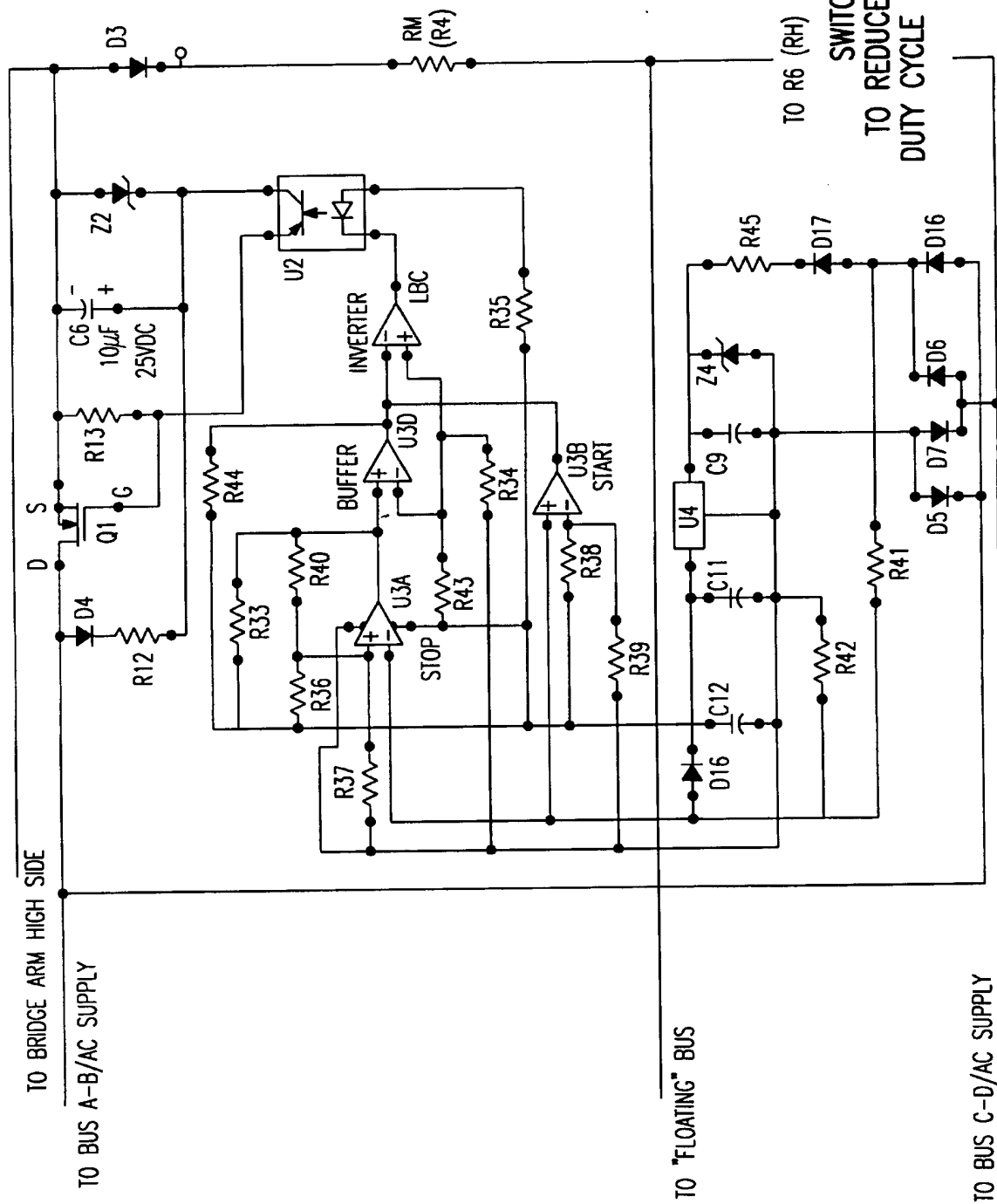


FIG.4





SWITCHING CIRCUIT  
TO REDUCE SENSING CURRENT  
DUTY CYCLE - QUAD COMPARATOR  
CIRCUIT FIG.6

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60° WHEN OPERATING AT DESIGN VOLTAGE

8.33 millisecond SAMPLING RATE FOR 120 CYCLE PULSATING DC SUPPLY (RECTIFIED 60 Hz AC)



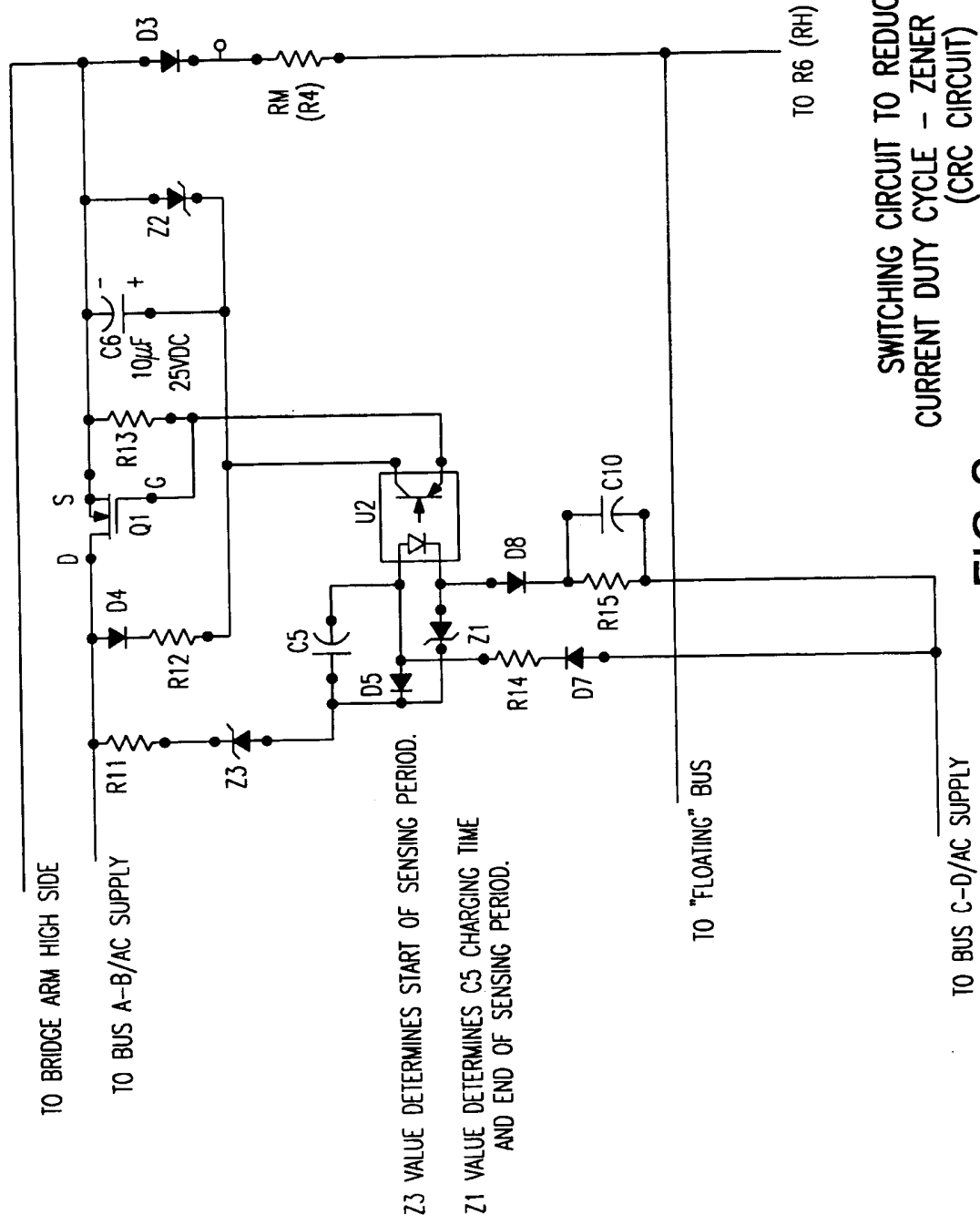
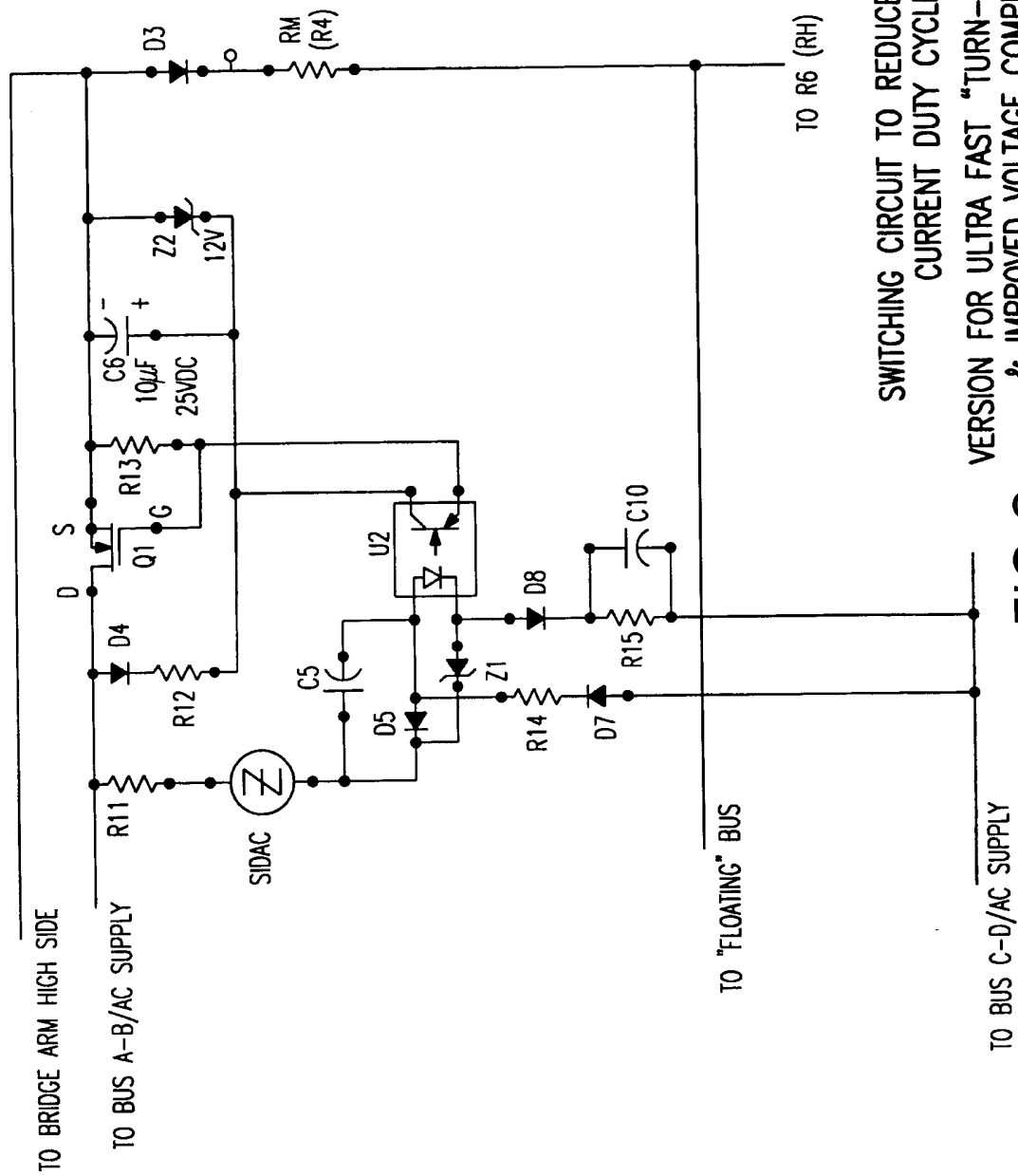


FIG.8





# SWITCHING CIRCUIT TO REDUCE SENSING CURRENT DUTY CYCLE VERSION FOR ULTRA FAST “TURN-ON” SWITCHING & IMPROVED VOLTAGE COMPENSATION

# DELAYED START SENSING PULSE & LOAD WAVEFORMS -CONTROLLED SLOPE LEADING AND TRAILING PULSE EDGE SWITCHING SHOWN

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60° AT DESIGN VOLTAGE  
 16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

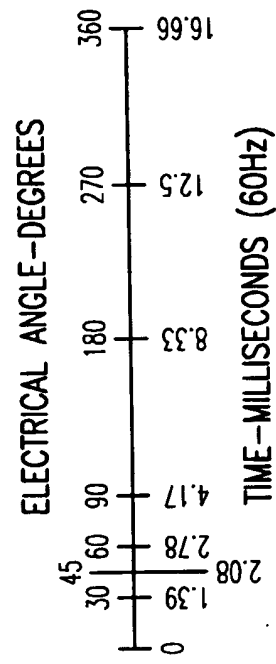
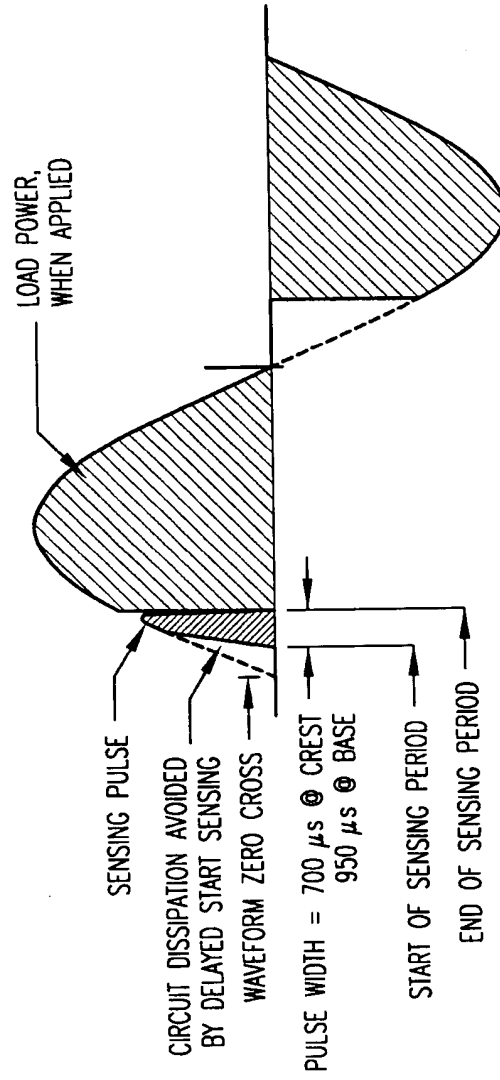


FIG.10

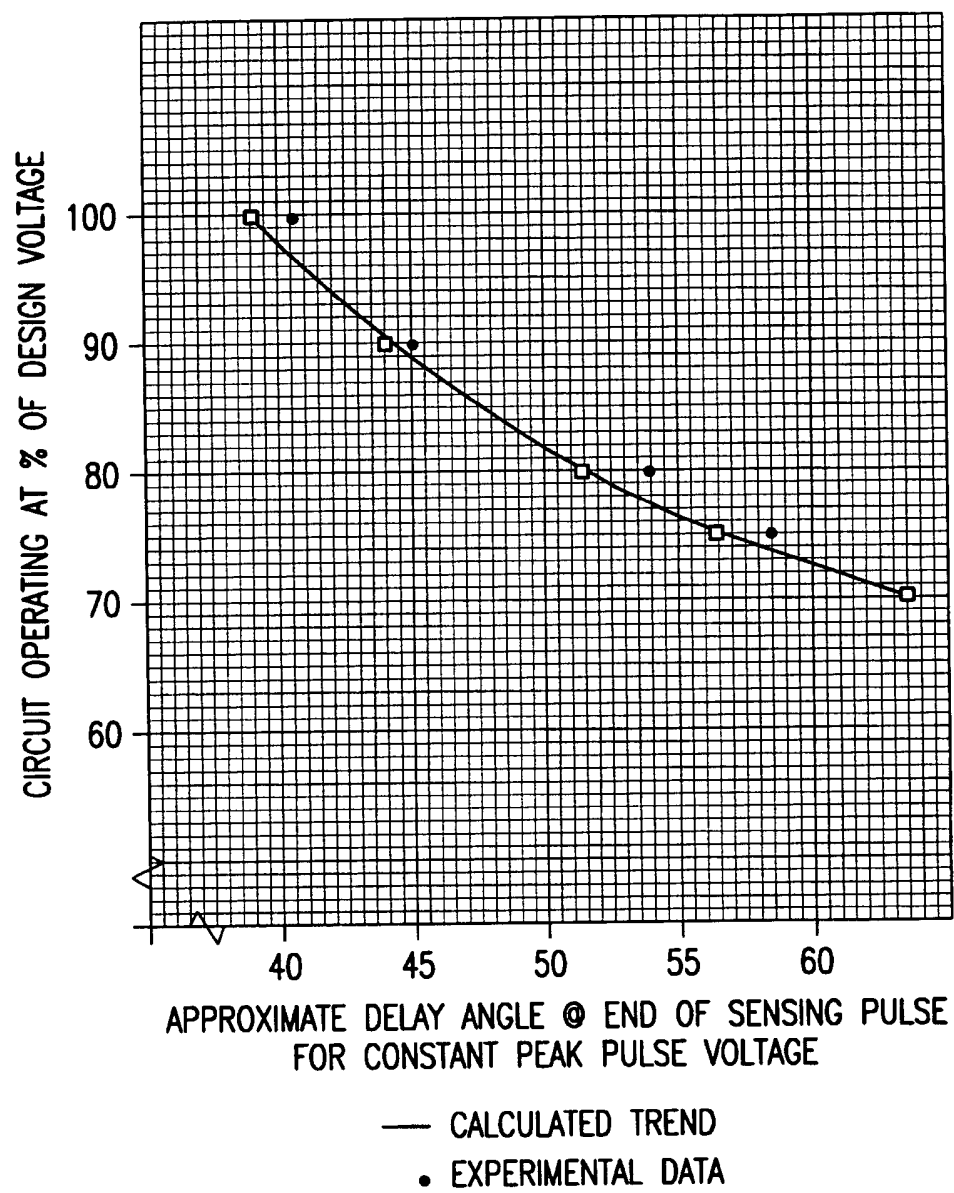


FIG.11

# DELAYED START SENSING PULSE & LOAD WAVEFORMS -100% DESIGN VOLTAGE NOMINAL 200 $\mu$ s PULSE WIDTH SHOWN

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60° WHEN OPERATING AT DESIGN VOLTAGE  
 16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

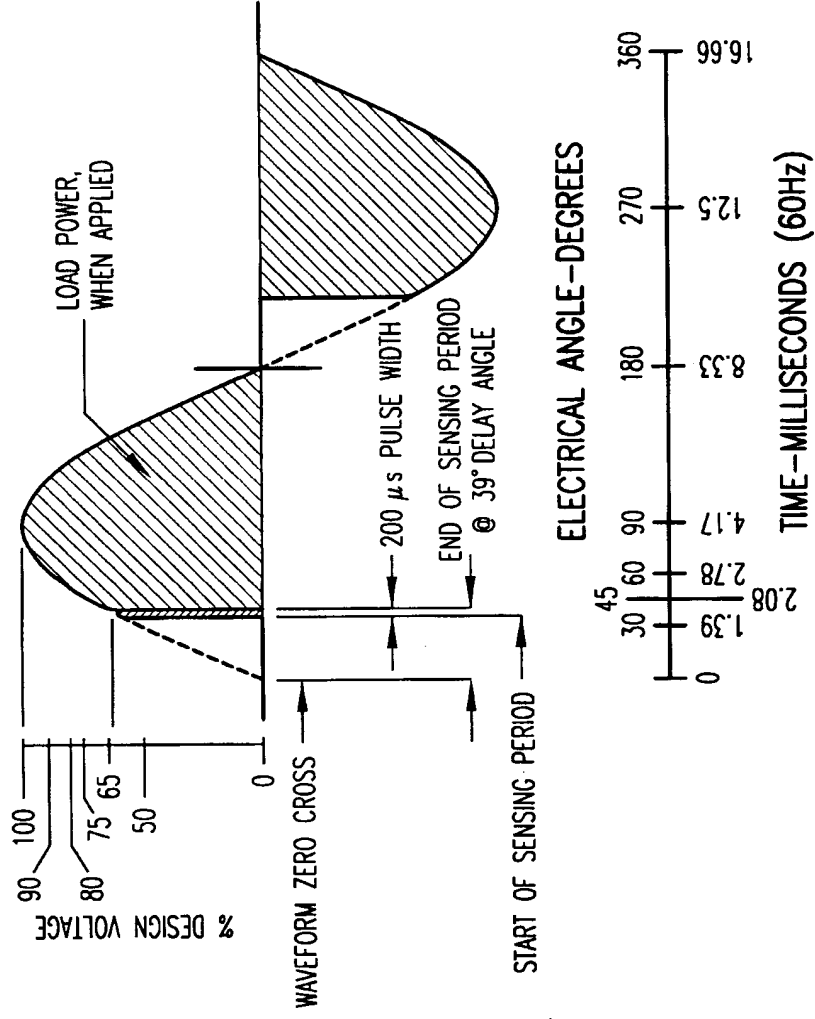


FIG.12

# DELAYED START SENSING PULSE & LOAD WAVEFORMS -90% DESIGN VOLTAGE -NOMINAL 200 $\mu$ s PULSE WIDTH SHOWN

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60° AT DESIGN VOLTAGE  
 16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

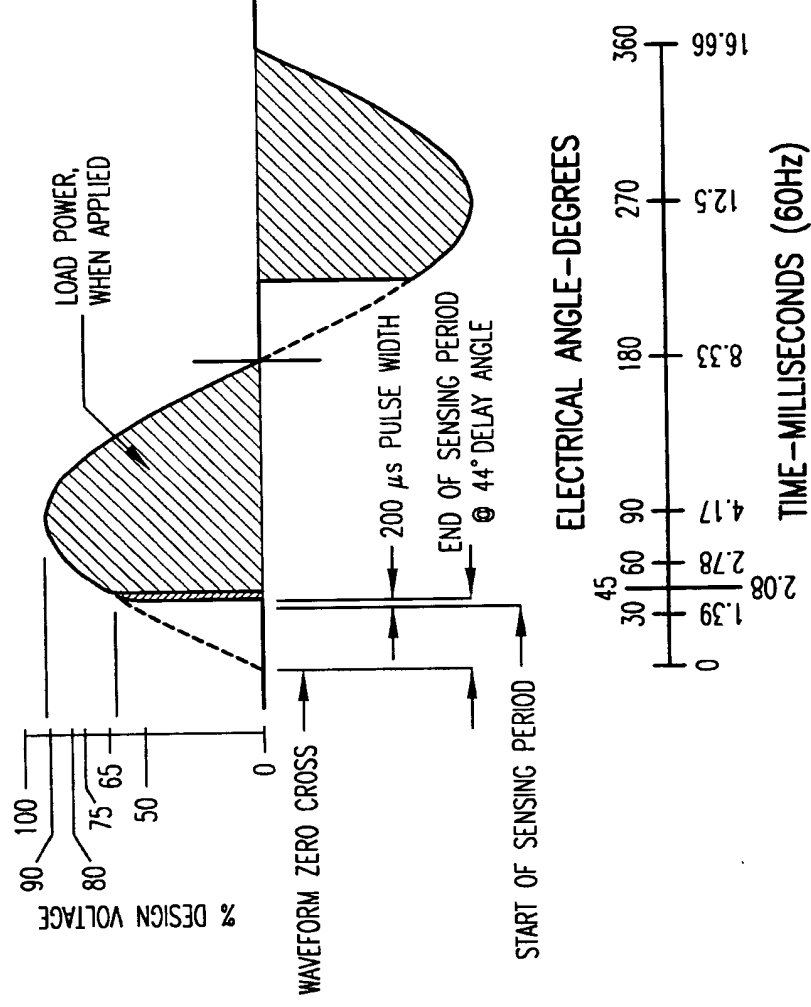


FIG.13

# DELAYED START SENSING PULSE & LOAD WAVEFORMS -80% DESIGN VOLTAGE -NOMINAL 200 $\mu$ s PULSE WIDTH SHOWN

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60° AT DESIGN VOLTAGE  
 16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

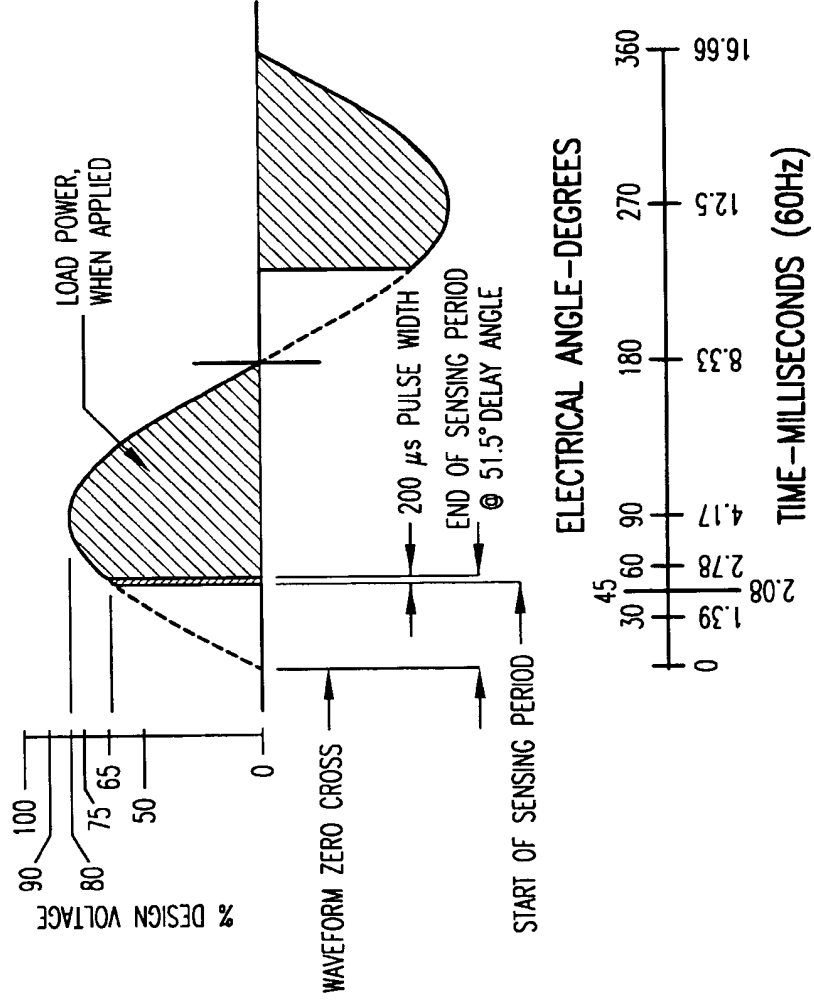


FIG.14

# DELAYED START SENSING PULSE & LOAD WAVEFORMS -75% DESIGN VOLTAGE -NOMINAL 200 $\mu$ s PULSE WIDTH SHOWN

- SENSING PULSE BEGINS BEYOND ZERO CROSS AND ENDS AT OR BEFORE 60° AT DESIGN VOLTAGE  
16.6 millisecond SAMPLING RATE FOR 60 CYCLE AC SUPPLY

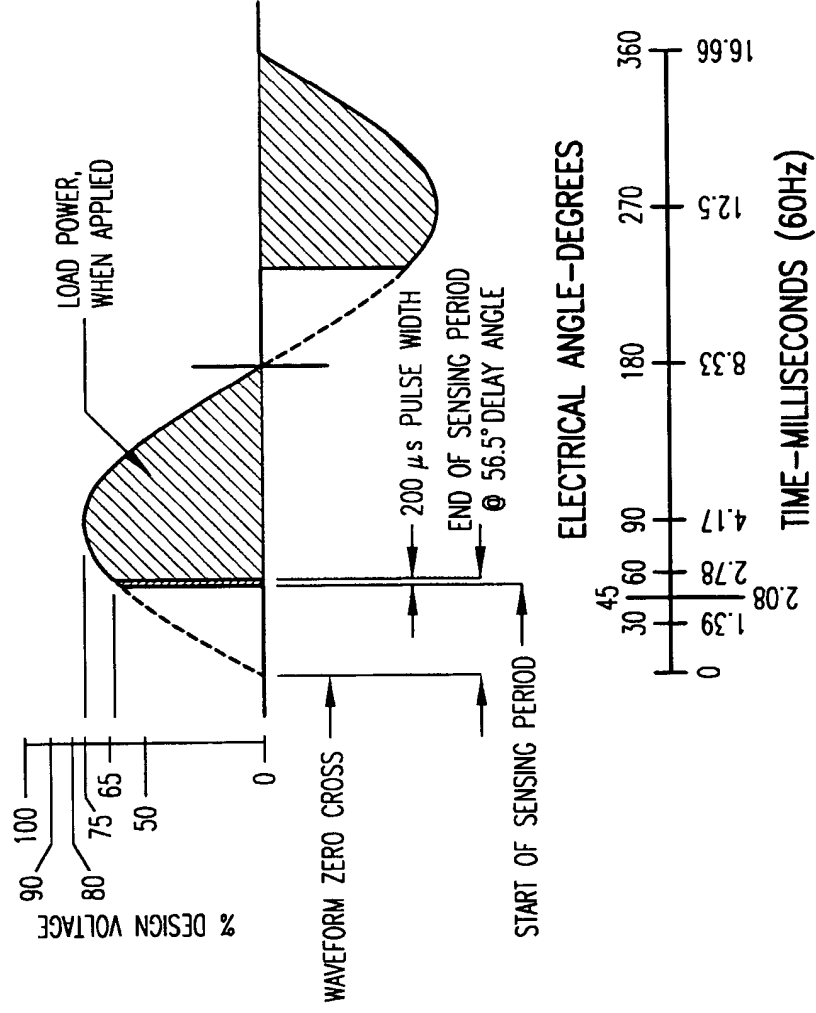


FIG.15

